

NEW RECORDS AND SPECIES OF CYMATIIDAE
(GASTROPODA : PROSOBRANCHIA) FROM
THE KERMADEC ISLANDS, NORFOLK RIDGE AND NEW ZEALAND

A.G. BEU

*New Zealand Geological Survey, D.S.I.R.,
Lower Hutt, New Zealand.*

SUMMARY

A new subgenus and species, *Distorsio* (*Distorsionella*) *lewisi*, are proposed for a small, weakly distorted shell combining the reticulate protoconch of *Sassia* (*Sassia*) with a long, weakly armed aperture and the operculum, proboscis, radula, and ridged columellar base of *Distorsio*; specimens are from the Kermadec Islands, Reinga Ridge and Norfolk Ridge. *Sassia* (*Sassia*) *marshalli* n. sp. is described from the Kermadec Islands. New records are *Distorsio constricta habei* Lewis from the Kermadec Islands (previous records from southern Japan, but recorded here also from the Philippines and north-western Australia), *Sassia* (*Sassia*) *nassariformis remensa* (Iredale) from the Bay of Plenty, New Zealand, *Sassia* (*Proxicharonia*) *palmeri* (Powell) from the Kermadec Islands and Norfolk Ridge, and *Ranella olearium* (Linnaeus), *Fusitriton magellanicus laudandus* Finlay, and *Cymatona kampyla kampyla* (Watson) from the Kermadec Islands.

INTRODUCTION

The subtidal molluscan fauna of the ridges and seamounts north of New Zealand and east of Australia is only slowly being revealed, as successive oceanographic expeditions dredge and trawl more successfully from the area. At present the situation is about that reached around New Zealand two decades ago, so it is not surprising that the following new records from the Kermadec Ridge have been brought to light by the New Zealand Oceanographic Institute and by Mr Alex Black on R.V. "Acheron" (material in N.Z. National Museum, Wellington). The seven species recorded here from the Kermadec Islands include (1) *Sassia* (*Proxicharonia*) *palmeri*, only recently recognised around northern New Zealand, and now seen to be a member of the restricted southwest Pacific fauna (including also *Neothais smithi*, *Semicassis royanum*, *Casmaria ponderosa perryi*, *Bursa* (*Lampadopsis*) *verrucosa*, and others). (2) a subspecies of *Distorsio* previously recorded only from southern Japan but a member of a species occurring also in the Caribbean and Panamic western America. (3) a distinctive new Kermadec Islands species of the formerly cosmopolitan but now sparsely distributed genus *Sassia* (sensu stricto).

(4) a new species of a new subgenus *Distorsio* (*Distorsionella*), apparently endemic to the area. (5) the widely distributed *Ranella olearium* (Linnaeus). (6 & 7) the widespread New Zealand and south eastern Australian taxa *Fusitriton magellanicus* and *Cymatona kampyla*. The opportunity is taken to record the eastern Australian taxon *Sassia* (*Sassia*) *nassariformis remensa* (Iredale) from New Zealand.

Other Cymatiidae in New Zealand Oceanographic Institute and National Museum dredged samples from the Kermadec Islands include *Charonia lampas rubicunda* (Perry), *Ranella australasia australasia* (Perry), and *Septa parthenopea* (von Salis Marschlin), all recorded previously on beaches at the Kermadec Islands (Iredale 1910; Oliver 1915). The following 18 taxa of Cymatiidae are now known from the Kermadec Islands:

Subfamily Ranellinae

- Cabestana* (*Cabestana*) *spengleri* (Perry, 1811)
- tabulata tabulata* (Menke, 1843)
- Cabestana* (*Turritriton*) *labiosa* (Wood, 1828)
- Charonia lampas rubicunda* (Perry, 1811)
- Cymatona kampyla kampyla* (Watson, 1885)
- Fusitriton magellanicus laudandus* Finlay, 1927
- Ranella australasia australasia* (Perry, 1811)
- olearium* (Linnaeus, 1758)
- Sassia* (*Sassia*) *marshalli* n. sp.
- Sassia* (*Austrosassia*) *parkinsonia* (Perry, 1811)
- Sassia* (*Proxicharonia*) *palmeri* (Powell, 1967)

Subfamily Cymatiinae

- Ranularia caudata* (Gmelin, 1791)
- dunkeri iredalei* Beu, 1968
- Septa exarata exarata* (Reeve, 1844)
- parthenopea parthenopea* (von Salis Marschlin, 1793)
- vespacea* (Lamarck, 1816)

Subfamily Distorsioninae

- Distorsio* (*Distorsio*) *constricta habei* Lewis, 1972
- Distorsio* (*Distorsionella*) *lewisi* n. sp.

TAXONOMY

Family Cymatiidae

Subfamily Ranellinae

Genus *Sassia* Bellardi, 1873

Subgenus *Sassia* sensu stricto

Sassia Bellardi, 1873: 219. Type species (by subsequent designation, Cossmann, 1903): *Triton apenninicum* Sassi, 1827, Miocene and Pliocene, Europe.

Phanozesta Iredale, 1936: 309. Type species (by original designation): *Phanozesta remensa* Iredale, 1936, Recent, New South Wales.

The writer (Beu 1976: 305) has given reasons for regarding *Austrotriton* Cossmann, 1903 and *Austrosassia* Finlay, 1931 as subgenera of *Sassia* Bellardi, 1873. Diagnostic features of *Sassia* (*Sassia*) are the cancellate, turbiniform protoconch of 2½-3 whorls, the small size, the elongate form with tall spire, the small muriciform aperture with flared lips, and the six or seven prominent denticles inside the outer lip.

Recent taxa previously referred to *Sassia* (*Sassia*) are the three geographic subspecies *S. nassariformis nassariformis* (Sowerby, 1902), South Africa, *S. nassariformis remensa* (Iredale, 1936) (Figs. 6, 13, 15, 16), New South Wales and newly recorded below from north-eastern New Zealand, and *S. nassariformis semitorta* (Kuroda & Habe in Habe, 1961) (Figs. 12, 14), Japan, and the

Japanese species *S. sakuraii* (Habe, 1961). All four are extremely similar in general appearance and coloration, in their narrow shape, in their strongly abaperturally hollowed varices, and in their sculpture of several rows of evenly spaced, small, narrowly rounded nodules at the junctions of equally prominent spiral cords and collabral costae. The new species named below differs from other Recent taxa in lacking prominent spiral cords, but agrees with them in all other diagnostic features.

The type species of *Sassia*, the European Miocene and Pliocene *S. apenninica* (Sassi) (Figs. 17, 18), differs from Recent taxa listed above only in its slightly shorter spire, slightly more prominent varices, and more widely spaced rows of nodules of which the peripheral two rows are more prominent and more sharply antero-posteriorly compressed than those of Recent taxa. Whatever the generic position of the many poorly known European fossil species currently placed in *Sassia* (some could belong in subgenus *Austrosassia*), there can be little doubt that *S. nassariformis*, *S. sakuraii*, and *S. marshalli* are consubgeneric with *S. apenninica*.

Sassia (Sassia) nassariformis (Sowerby, 1902)

Lotorium nassariforme Sowerby, 1902: 95, pl. 2, fig. 7.

Argobuccinum (Cymatiella) nassariforme; Barnard, 1963: 24, fig. 3c (protoconch).

As interpreted here, this is another of the very widespread species of Cymatiidae with several widely disjunct geographic subspecies. In this case the specimens from different areas are almost inseparable, but slight differences in colour pattern and nodule size make recognition of subspecies desirable, although they are in need of further study. Taxa included in *S. nassariformis* are:

S. nassariformis nassariformis (Sowerby), South Africa.

S. nassariformis remensa (Iredale) (Iredale 1936: 309, pl. 23, fig. 4, pl. 24, fig. 5), eastern Australia, and here recorded from northern New Zealand.

S. nassariformis semitorta (Kuroda & Habe in Habe) (Kuroda & Habe 1952: 76, *nomen nudum*; Kuroda & Habe in Habe, 1961: 46, pl. 23, fig. 4), southern Japan.

S. nassariformis n. subsp., relatively short, pale specimens dredged off Western Australia (in Western Australian Museum).

Sassia (Sassia) nassariformis remensa (Iredale, 1936)

Figs. 6, 13, 15-16.

Phanozesta remensa Iredale, 1936: 309, pl. 23, fig. 4, pl. 24, fig. 5; Garrard 1961: 14; Iredale & McMichael 1962: 55.

The single specimen examined from New Zealand is a freshly dead shell with a bright red-brown colour pattern, retaining much of the thin, straw coloured, sparsely bristled periostracum on the last whorl. It agrees in all details of shape, size, protoconch shape and sculpture, teleoconch sculpture, and aperture with specimens from New South Wales. It is surprising that this formerly Australian subspecies should not be taken in New Zealand waters until 1974, but no doubt the lack of previous collection is explained by the depth at which it lives, and the paucity of sampling at this depth around north-eastern New Zealand. New South Wales specimens have been recorded from 200 m (Iredale 1936, p. 309) and from 130 m and over (Garrard 1961, p. 14).

Dimensions: height 39.3 mm, diameter 18.3 mm.

Locality: N.Z. Oceanographic Institute stn. J709, 11/9/1974, 37° 15.2'S, 176° 50.0'E, central Bay of Plenty northwest of White Island, dredged in 328-406 m.

Sassia (Sassia) marshalli n. sp.

Fig. 9-11.

Shell small, elongate, with spire about equal to height of aperture plus siphonal canal. Whorls well inflated, lightly angled at the periphery by a faint spiral cord, but progressively less so down the shell. Sculpture of well raised, narrow-based, narrowly rounded, widely spaced collabral costae extending from suture to suture of spire whorls and onto the base of the last whorl, five in the last intervariceal space, six in the penultimate and seven in the antepenultimate intervariceal space; the whole surface crossed by numerous low, closely spaced, narrow, spiral threads, of which two or three on spire whorls and three or four on the last whorl are faintly more prominent than the others, and correspond to prominent cords of other species of *Sassia* (s. str.); 10 slightly more prominent threads on canal; all rendered microscopically cancellate by extremely numerous, fine, collabral threads over entire

surface. Siphonal canal short, weakly inclined towards the dorsum. Aperture oval, slightly larger than those of other species of *Sassia* (s. str.), with flared inner and outer lips, the inner edge of the outer lip bearing seven prominent denticles and the inner lip bearing a single prominent parietal ridge, margining a narrow posterior canal, and four weak ridges at the base of the columella. Varices arranged regularly at each two-thirds of a whorl, narrowly rounded, deeply hollowed, abaperturally, lacking nodules. Protoconch of three rounded whorls, bearing three low, narrow, widely spaced spiral cords that are evenly cancellated by low, narrow, widely spaced collabral costae. Colour medium orange-tan, with slightly darker, diffuse bands on a few spiral cords of the last whorl, and with small brown spots along the outer edges of terminal and earlier varices.

Dimensions: height 37.7 mm, diameter 19.2 mm (holotype).

Holotype (NZOI 231) and paratype (NZOI P326) in New Zealand Oceanographic Institute, Wellington.

Localities: N.Z. Oceanographic Institute stn. K844, 30° 11.2'S, 178° 33.8'W, off the Kermadec Islands in 290 m, 29/7/1974 (holotype); N.Z. Oceanographic Inst. stn. K826(3), 28° 48'S, 177° 48'W, N. of Raoul I., 390-490 m, 25/7/1974 (one fragmentary paratype).

The new species differs from all other Recent taxa of *Sassia* and from *S. apenninica* in lacking prominent spiral cords and the rows of small nodules where the cords cross the collabral costae, in having extremely narrow, well raised, "pinched" collabral costae, in having a slightly larger aperture and slightly more inflated whorls, and thus being proportionally wider, in having a shorter siphonal canal, and in its more subdued coloration; other Recent taxa have alternating light and dark spiral cords on a diffusely varied red-brown background, with dark red-brown patches on varices between the spiral cords, and with the same outer-lip spots as on *S. marshalli*. The combination of prominent, narrowly "pinched" collabral costae with very weak spiral sculpture makes this a highly distinctive shell.

The new species is named in honour of Mr Bruce Marshall, National Museum of New Zealand, who pointed out the new material in this paper to the writer, and who is monographing the molluscan fauna of the Kermadec Islands and Norfolk Ridge.

Subgenus *Proxicharonia* Powell, 1938

Charoniella Powell & Bartrum, November 1929: 426 (not *Charoniella* Thiele, October 1929 = *Negyrina* Iredalé, September 1929). Type species. (by original designation): *Charonia* (*Charoniella*) *arthritica* Powell & Bartrum, 1929, Lower Miocene, New Zealand.

Proxicharonia Powell, 1938: 373. Replacement name for *Charoniella* Powell & Bartrum, 1929, non Thiele.

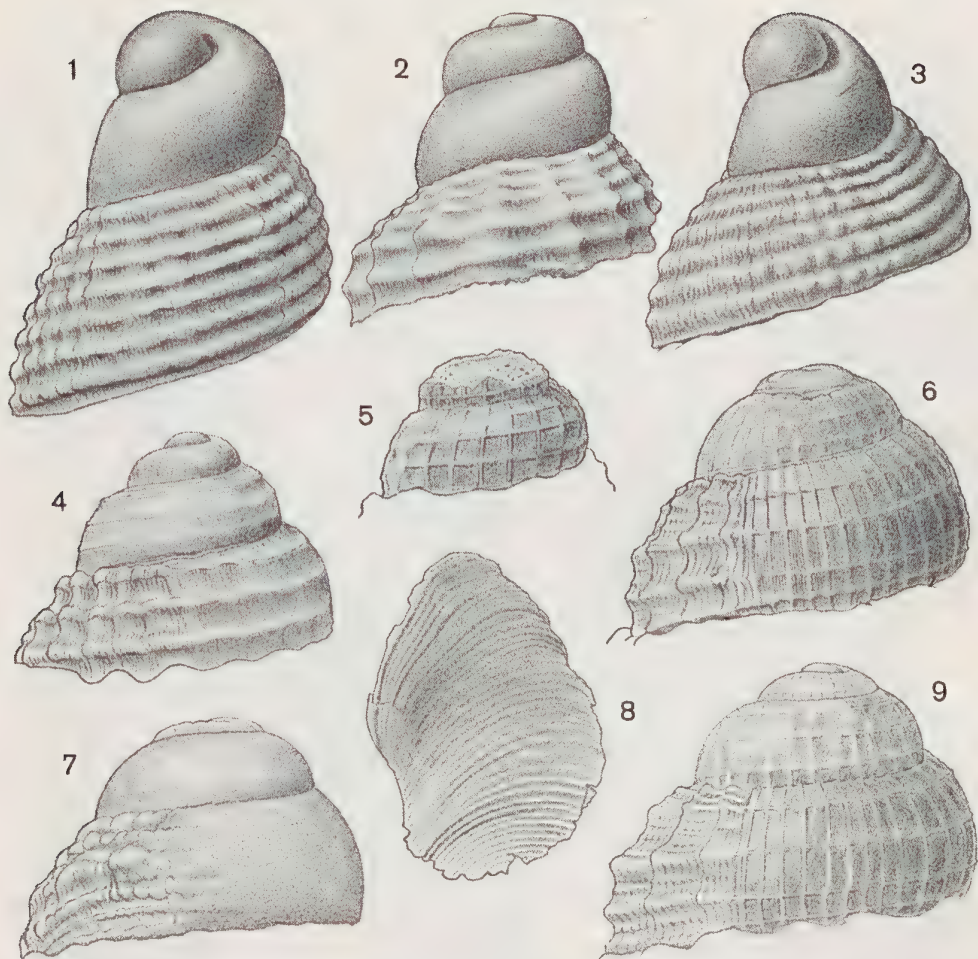
Sassia (*Proxicharonia*) *palmeri* (Powell, 1967)

Figs. 7, 26, 27.

Phroxicharonia palmeri Powell, 1967, p. 188, pl. 36, figs. 11, 12; Cernohorsky 1970, p. 187, fig. 2-5.

Sassia (*Proxicharonia*) *palmeri* has previously been recorded only from specimens taken by scuba divers at the Poor Knights Islands, New Zealand, and as a single shell found on the beach at Great Exhibition Bay, New Zealand, by Mr R. C. Willan. Six specimens can now be recorded from ridges to the north of New Zealand, five from near the Kermadec Islands and one from the Norfolk Ridge. The largest shell examined (Fig. 27) is 67 mm high, considerably larger than the largest of the 10 or so shells so far collected in New Zealand.

Cernohorsky (1970: 87, figs. 3-5) described an animal and figured the penis, operculum and radula of a Poor Knights Islands specimen of *Sassia* (*Proxicharonia*) *palmeri*, and pointed out that there are few differences between any of these features and those of *Sassia* (*Austrosassia*) *parkinsonia* (Perry). The protoconch of *Proxicharonia* has not been described previously, but worn ones remain on several of the present specimens, and similar but more eroded ones have been seen on a few New Zealand Lower Miocene specimens of *Proxicharonia*. The most complete available protoconch (Fig. 7) is turbiniform and smooth with well inflated whorls, and indistinguishable from that of *S. parkinsonia*. It is not possible to say whether any significant surface sculpture has been eroded from this protoconch, but none has been observed on any fossil or Recent specimens of *Proxicharonia*. The elongate, charoniiform shell shape is the only remaining criterion distinguishing *Proxicharonia* from the shorter, more prominently shouldered *Sassia* (*Austrosassia*), but as the two groups have been separate since at least Middle Eocene time in New Zealand, *Proxicharonia* should be maintained as a further subgenus of *Sassia*.



FIGURES 1-7, 9. Protoconchs of Cymatiidae and Cancellariidae, all enlarged X25.

1. *Semitriton dennanti* (Tate) (Cancellariidae), type species of *Semitriton* Cossmann; Glen Aire Clay, Point Flinders, west of Cape Otway, Victoria, Aldingan (Upper Eocene); WM 10589, N.Z. Geological Survey.
2. *Tatara revoluta* (Finlay) (Cancellariidae), GS 9841, Lorne, Waiareka Valley, Oamaru, New Zealand, Kaiatan (Upper Eocene); TM 5146, N.Z. Geological Survey.
3. *Semitriton varicosus* (Tate) (Cancellariidae), Browns Creek Clay, washout nearest Brown's Creek, Johanna, Victoria, Aldingan (Upper Eocene); P31009, National Museum of Victoria.
4. *Distorsio* (*Personella*) *septemdentata* Gabb, type species of *Personella* Conrad; Crockett Formation, Claiborne Group, Little Brazos River, Texas, Upper Eocene; WM5375, N.Z. Geological Survey.
5. *Distorsio* (*Distorsionella*) *lewisi* n. sp., paratype NZOIP323, N.Z. Oceanographic Inst. stn. 197, Wanganella Bank, Norfolk Ridge, 540-544 m.
6. *Sassia* (*Sassia*) *nassariformis remensa* (Iredale), type species of *Phanozesta* Iredale; 135 m, off Botany Bay, New South Wales, M.V. "Challenge"; WM 9319, N.Z. Geological Survey.
7. *Sassia* (*Proxicharonia*) *palmeri* (Powell), BS 307, between meteorological station and Hutchinson Bluff, Raoul I., 145-110 m, R.V. "Acheron"; MF24489, N.Z. National Museum.
9. *Sassia* (*Sassia*) *marshalli* n. sp., holotype, N.Z. Oceanographic Inst. stn. K84 4, off the Kermadec Islands, 290 m; NZOI 231, N.Z. Oceanographic Institute.

FIGURE 8. Operculum of *Distorsio* (*Distorsionella*) *lewisi* n. sp., paratype NZOI P324, locality as for Fig. 5 (enlarged X 12.5).

Localities: *Kermadec Islands* : BS307, between meteorological station and Hutchinson Bluff, Raoul I., 80-60 fm (145-110 m), R.V. "Acheron", 4/4/1973 (N.Z. National Museum, MF24489). BS309, off Bell's Flat, Raoul I., 120-190 fm (220-350 m), R.V. "Acheron", 4/4/1973 (N.Z. National Museum, MF 26360). BS437, bearing 338° T, 3.2 naut. miles off Fleetwood Bluff, Raoul I., 84 fm (154 m), R.V. "Acheron", 25/10/1975 (N.Z. National Museum, MF 25414). N.Z. Oceanographic Institute stn. K843, 30° 16.5'S, 178° 34.5'W, in 254-260 m, off Kermadec Islands, 29/7/1974. N.Z. Oceanographic Institute stn K869, 31° 21.6'S, 178° 53.0'W, in 285-390 m, off l'Esperance Rock, 1/8/1974.

Norfolk Ridge : N.Z. Oceanographic Institute stn. J705, 37° 16.0'S, 176° 51.0'E, Rangatira Knoll, in 190 m, 11/9/1974.

Genus *Fusitriton* Cossmann, 1903

Fusitriton Cossmann, 1903: 109. Type species (by original designation): *Triton cancellatus* Lamarck, 1816 (= *Neptunea magellanica* Röding, 1798), Recent, South America.

Fusitriton magellanicus laudandus Finlay, 1927

Prione retiolium; Finlay, 1924: 462 (not of Hedley, 1914).

Fusitriton laudandum Finlay, 1927: 399, pl. 20, fig. 65.

Fusitriton cancellatus laudandus; Beu, in press (synonymy, taxonomic revision).

Both *Fusitriton magellanicus* and *Cymatona kampyla kampyla* are common throughout central and southern New Zealand, and throughout southern and eastern Australia, at least as far north as northern New South Wales where, however, *F. magellanicus* is represented by the geographic subspecies *F. magellanicus retiolus* (Hedley). They have an optimum depth of about 300 to 600 m in the New Zealand region. In view of this depth and geographic distribution it is not surprising that both species occur in the deeper samples now being taken around the Kermadec Islands.

New Zealand Oceanographic Institute stn. K870, near l'Esperance Rock, Kermadec Islands, in 510-610 m contained, besides *Distorsio (Distorsionella) levisi*, two large, typical but broken shells of *Fusitriton magellanicus laudandus* Finlay, together with *Cymatona*, *Conus*, *Vexillum*, and *Gemmula*. Beu (in press) recorded *F. magellanicus laudandus* sparsely as far north as the Three Kings Islands and from one sample on the southern end of Norfolk Ridge, but this is the sole record from the Kermadec Islands.

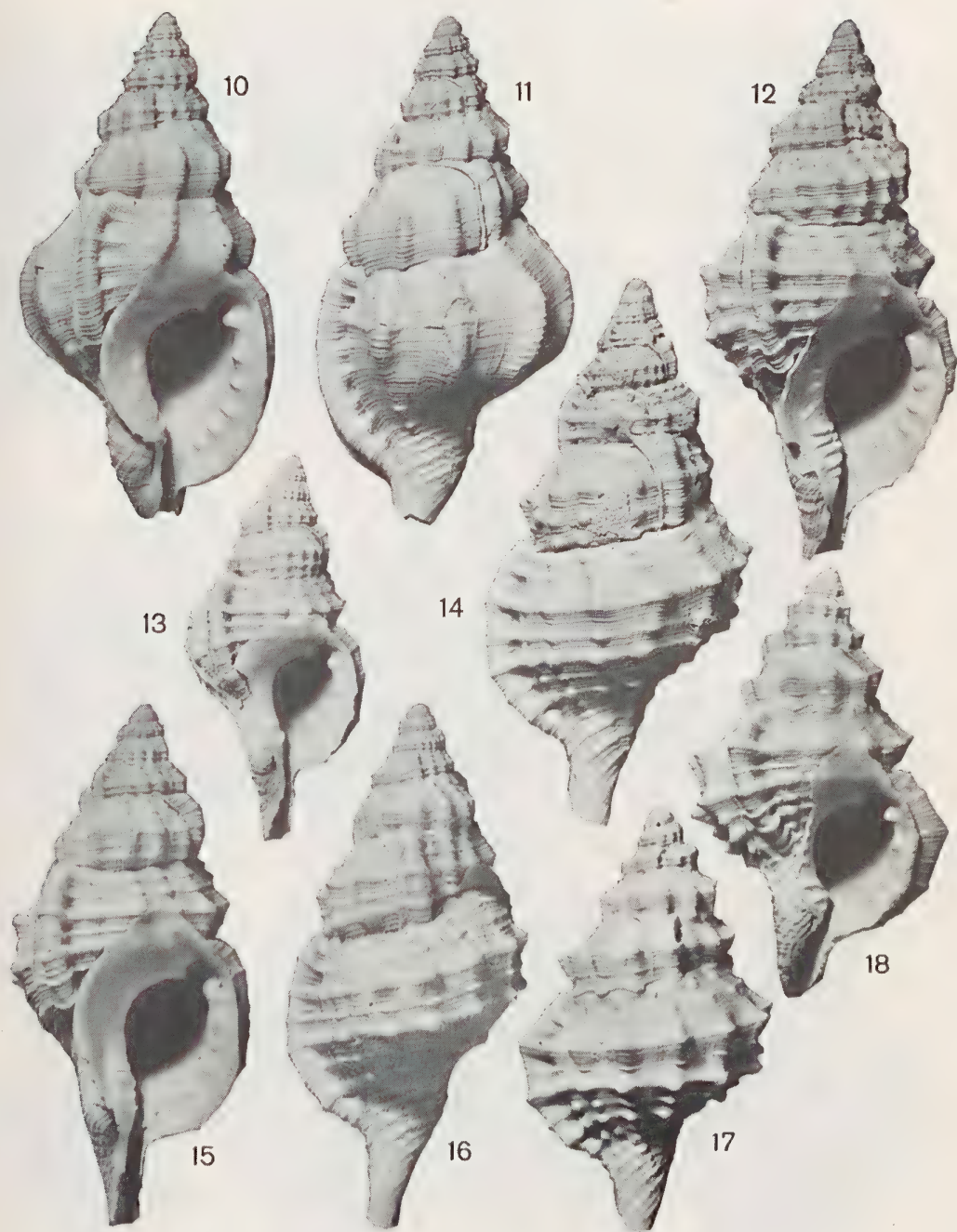
It is interesting that the Kermadec Islands specimens of *Fusitriton magellanicus* show the strong sculpture and weak, irregularly placed varices of the New Zealand subspecies *F. magellanicus laudandus*, and do not fall into the larger, more finely sculptured, and more coarsely and regularly varicate *F. magellanicus retiolus*. This suggests that the distribution of even this extremely widely dispersed taxon, with long-lived planktonic larvae, is controlled to some extent by continuity of submarine ridge systems.

Genus *Cymatona* Iredale, 1929

Cymatona Iredale, 1929: 177. Type species (by original designation): *Nassaria kampyla* Watson, 1883, Recent, New Zealand, eastern Australia, and the Kermadec Islands.

FIGURES 10-18. *Sassia* (sensu stricto) species, all enlarged X 2.

- 10, 11. *Sassia marshalli* n. sp., holotype, N.Z. Oceanographic Inst. stn. K844, off the Kermadec Islands, 290 m; NZOI 231, N.Z. Oceanographic Institute.
- 12, 14. *Sassia nassariformis semilorta* (Kuroda & Habe in Habe), Tosa Bay, Shikoku, Japan, 150 m; WM 11487, N.Z. Geological Survey.
13. *Sassia nassariformis remensa* (Iredale), type species of *Phanozesta* Iredale; immature specimen, 135 m, off Botany Bay, New South Wales; WM 9319, N.Z. Geological Survey.
- 15, 16. *Sassia nassariformis remensa* (Iredale), N.Z. Oceanographic Inst. stn. J709, northwest of White L., Bay of Plenty, New Zealand, in 328-406 m; N.Z. Oceanographic Institute.
- 17, 18. *Sassia apenninica* (Sassi), type species of *Sassia* Bellardi; Pliocene of Piedmont, Italy; WM 5358, N.Z. Geological Survey.



Cymatona kampyla kampyla (Watson, 1883)

Nassaria kampyla Watson, 1883: 594; Watson 1886: 405, pl. 14, fig. 12.

Cymatona kampyla kampyla; Beu, in press (synonymy, taxonomic revision).

New Zealand Oceanographic Institute stn. K870, near l'Esperance Rock, Kermadec Islands, in 510-610 m contained, besides the taxa listed above, a single complete, empty shell of *Cymatona kampyla kampyla*. Beu (in press) recorded the subspecies abundantly off eastern Australia and in southern New Zealand, most commonly in depths of 300 to 600 m, but specimens become progressively less common in northern New Zealand, and very few live specimens have been taken north of Cook Strait. However, it is not surprising that such a widely distributed taxon should occur sparsely at the Kermadec Islands.

Genus *Ranella* Lamarck, 1816

Ranella Lamarck, 1816: pl. 413. Type species (by subsequent designation, Children, 1823): *Ranella gigantea* Lamarck, 1816 (= *Murex olearium* Linnaeus, 1758), Miocene to Recent, Europe; Recent, Mediterranean - Atlantic - South Africa - New Zealand.

Reasons for regarding *Mayena* Iredale, 1917 as a synonym of *Ranella* Lamarck, 1816 were given by Beu (1976: 300).

Ranella olearia (Linnaeus, 1758)

Murex olearium Linnaeus, 1758: 748.

Ranella gigantea Lamarck, 1816: pl. 413, fig. 1.

Ranella olearium; Dell & Dance 1963: 162 (synonymy), pls. 16, 17.

Bursa barcellosi Matthews, Rios & dos Santos Coelho, 1973: 51, figs. 1-5.

The synonymy and distribution of this large, distinctive species were given by Dell & Dance (1963). The previously known distribution of Recent specimens is the Mediterranean Sea, the eastern Atlantic from off southern Ireland to Angola, the western Atlantic off Bermuda (H.A. Rehder, written commun.) and off Rio Grande do Sul, Brazil (Matthews *et al.* 1973, as *Bursa barcellosi*), off South Africa, St. Paul and Amsterdam Islands in the southern Indian Ocean (Arnaud & Beuoris 1972), and around northern New Zealand as far south as Banks Peninsula. Strangely, for a species that is presumably dispersed between South Africa and New Zealand as planktonic larvae, no specimens are known from Australia. This distribution pattern is made all the more incomprehensible by the present record of a single broken specimen of *Ranella olearia* from the southern Kermadec Ridge north of New Zealand.

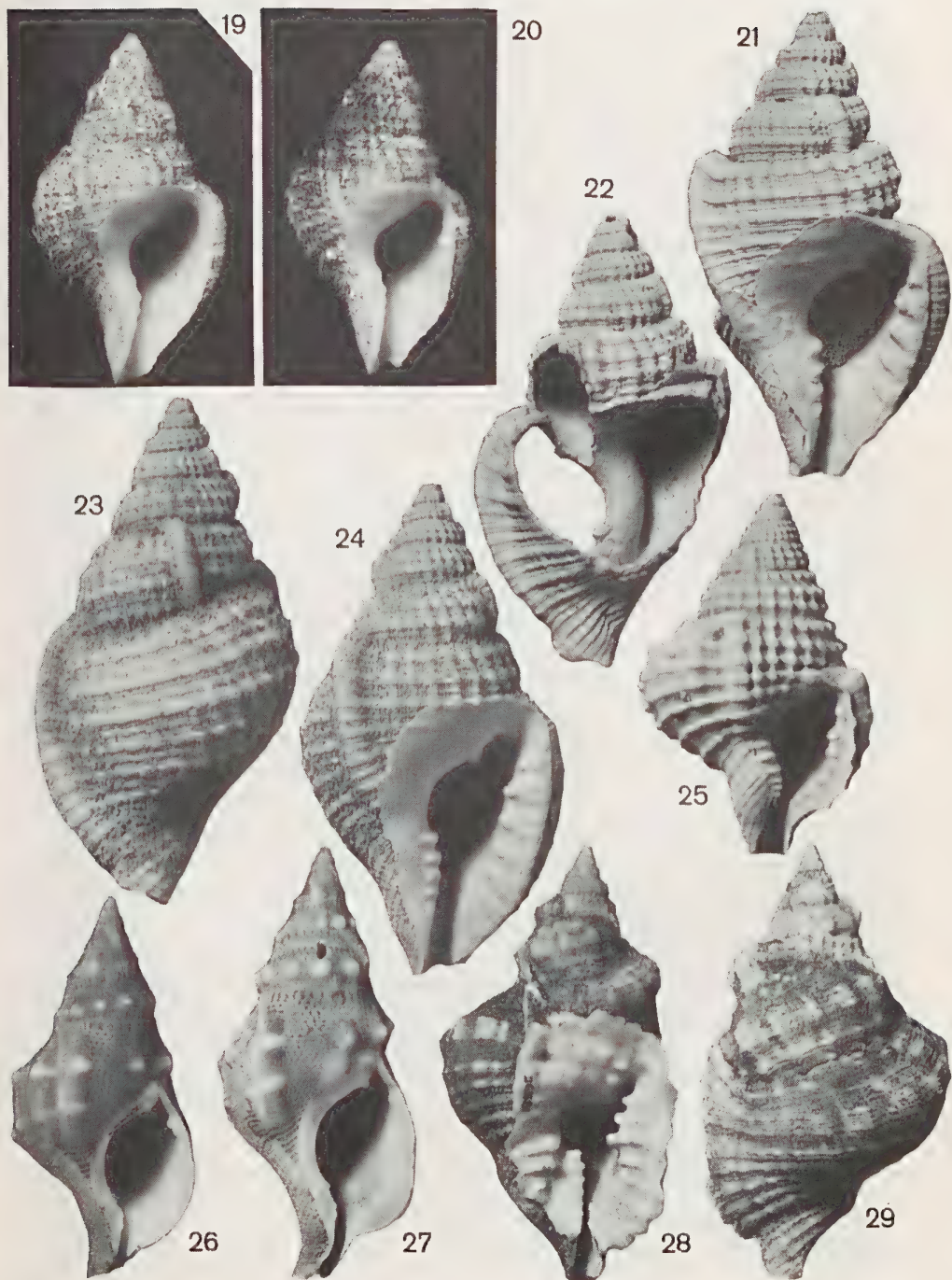
Locality: N.Z. Oceanographic Institute stn. K795, 33° 02.6'S, 179° 34.6'W, Star of Bengal Bank, Kermadec Ridge, 18/7/1974, in 270 m (with *Charonia lampas rubicunda*).

Subfamily Distorsioninae Kuroda, Habe & Oyama, 1971

The genitive form of *-torsio* (Latin: a wringing or gripping) is *-torsionis*, so a subfamily name based on *Distorsio* should be spelled Distorsioninae.

Figures 19-29.

- 19-24. *Distorsio* (*Distorsionella*) *lewis* n. sp., N.Z. Oceanographic Institute specimens enlarged X 2. Figs. 19, 20 - paratypes NZOI P323 and NZOI P324, collected with animals, N.Z. Oceanographic Inst. stn. 197, Wanganella Bank, Norfolk Ridge, 540-544 m. Figs. 21, 22 - paratype NZOI P325, N.Z. Oceanographic Inst. stn. K870, off l'Esperance Rock, Kermadec Islands, 510-610 m. Figs. 23, 24 - holotype, NZOI 230, N.Z. Oceanographic Inst. stn. P57, central Reinga Ridge, 563-614 m.
25. *Distorsio* (*Personella*) *septemdentata* Gabb, type species of *Personella* Conrad; unlocalised, Claiborne Group (Eocene) of Texas; WM 10585, N.Z. Geological Survey (enlarged X 3).
- 26, 27. *Sassia* (*Proxicharonia*) *palmeri* (Powell), off the Kermadec Islands, natural size. Fig. 26 - BS 307, between meteorological station and Hutchinson Bluff, Raoul I., 145-110 m; MF 24489, N.Z. National Museum. Fig. 27 - largest specimen, N.Z. Oceanographic Inst. stn. K843, east of Macauley and Curtis Islands, 254-260 m.
- 28, 29. *Distorsio* (*Distorsio*) *constricta habe* Lewis, BS 572, southeast of Smith Bluff, Raoul I., 82-100 m; MF 26581, N.Z. National Museum, natural size.



Genus *Distorsio* Röding, 1798Subgenus *Distorsio* sensu stricto

Distorsio Röding, 1798: 133. Type species (by subsequent designation, Gray, 1847): *Murex anus* Linnaeus, 1758, Recent, Indo-West Pacific.

Distortrix Link, 1807: 122. Type species (by subsequent designation, Dall, 1904): *Murex anus* Linnaeus, 1758.

Persona Montfort, 1810: 603. Type species (by monotypy): *Murex anus* Linnaeus, 1758.

Distorta Perry, 1811: pl. 2. Type species (by subsequent designation, Emerson & Puffer, 1953): *Murex anus* Linnaeus, 1758.

Distortio "Bolten" Gray, 1847: 133 (invalid emendation of *Distorsio* Röding, 1798).

Rhysema Clench & Turner, 1957: 236. Type species (by original designation): *Triton clathratus* Lamarck, 1816, Recent, Caribbean.

Lewis (1972) pointed out that *Distorsio burgessi* Lewis, 1972 and *D. perdistorta* Fulton, 1938 are intermediate in apertural features between *D. anus* and typical species of *Distorsio* (*Rhysema*) such as *D. clathrata* (Lamarck, 1816) and *D. reticulata* (Röding, 1798), and so synonymised *Rhysema* with *Distorsio* (sensu stricto).

Distorsio (Distorsio) constricta habei Lewis, 1972

Figs. 28, 29.

Distorsio (Rhysema) perdistorta; Habe, 1961: 46, pl. 23, fig. 1 (not of Fulton, 1938); Habe 1964: 74, pl. 23, fig. 1.

Distorsio constricta habei Lewis, 1972: 38, figs. 4, 10, 38, 39.

A single large specimen from the Kermadec Islands closely resembles *Distorsio constricta habei* Lewis, previously recorded from southern Japan only. Significant features of Japanese shells described by Lewis (1972), such as the pale orange-brown external colour, the closely spaced pair of peripheral spiral cords with a wider space below them, the sculpture of the inner and outer lips, the constriction of the siphonal canal by the anterior end of the outer lip, the extreme shell distortion, the presence of only 13 high, widely spaced collabral costae in each intervariceal space, and the short, fine periostracal bristles, are identical in the Kermadec Islands shell. The Kermadec specimen differs from Japanese ones only in its greater size, presumably having added a single growth step and varix beyond the size normally reached by Japanese specimens. No differences of taxonomic significance can be recognised.

Lewis (1972: 42) and Japanese authors have recorded the subspecies from south-eastern Japan only, from Boso Peninsula, Honshu to Tosa Bay, Shikoku, at depths of 100 to 200 m, and this would make an isolated Kermadec Islands record rather startling. However, the writer has examined other Pacific specimens of *Distorsio constricta habei*. Three Philippine Islands shells in the Western Australian Museum are typical, relatively small, strongly shouldered specimens of *D. constricta habei*: 52 fm, Panglao I., off Bohol I., Philippines, Mariel King on M.V. "Pele", 8/2/64 (2 specimens); 60-70 fm, Laoy I., off Bohol I., Philippines, 9/2/64 (1 specimen). Also seven small, immature shells in the Western Australian Museum from off northern Western Australia belong in a species distinct from the common *D. reticulata*, and seem referable to *D. constricta habei*: CSIRO stn. 17, 22° 59'S, 113° 25'E, SW of Pt. Cloates, Western Australia, 71 fm, 31/1/1964 (5 shells); CSIRO stn. 173, 21° 50'S, 113° 46'E, W. of Northwest Cape, Western Australia, 75 m, 6/10/1963 (1 shell); CSIRO stn. 187, 23° 39'S, 112° 11'E, S.W. of Pt. Cloates, Western Australia, 73 fm, 7/10/1963 (1 shell). So the apparent geographic separation of Japanese and Kermadec Island populations is not as wide as it seems at first, and probably *D. constricta habei* is widespread but uncommon in the western Pacific Ocean.

Dimensions of Kermadec I. shell: height 65.0 mm, greatest diameter 36.6 mm.

Locality: BS 572, 29° 18.9'S, 177° 56.4'W, south-east of Smith Bluff; Raoul I., in 82-100 m, R. V. "Acheron", 10 Nov. 1976 (N.Z. National Museum, MF 26581).

Subgenus *Distorsionella* n. subgen.

Type species: *Distorsio (Distorsionella) lewisi* n. sp.

The subgenus *Distorsio (Personella)* (Conrad 1865: 21) differs from *Distorsio* (sensu stricto) in its small size, its weakly distorted coiling, and its weakly armed aperture with only narrowly extended

columellar callus shield. Maxwell (1968) described a New Zealand Upper Eocene species and discussed the other members of the subgenus and their possible dispersal routes; almost all are Paleocene to Oligocene fossils, scattered sparsely around the world. Subsequently Cernohorsky (1975: 215, figs. 5-9) redescribed the only species referred to the subgenus in the living fauna, the very small Indo-West Pacific *D. (Personella) pusilla* Pease, 1861.

The species named below agrees in most features with the Eocene and Oligocene members of *Distorsio (Personella)*, but reaches a larger size and has a larger, more open, and even more weakly armed aperture than species of *D. (Personella)*; the aperture and base of the last whorl taper gradually into a long, broadly open siphonal canal, giving the shell a very different appearance from the sharply contracted base of *D. (Personella)*. The single protoconch remnant (Fig. 5) on the available specimens has widely spaced, fine, reticulate sculpture similar to that on the protoconch of *Sassia* (s. str.), whereas *D. pusilla* Pease has a smooth protoconch and the type species of *Personella*, *D. (Personella) septemdentata* Gabb, has a protoconch with narrow, widely spaced spiral cords but no prominent collabral sculpture (Fig. 4). The proboscis, radula and operculum of *D. lewisi* are very similar to those of *Distorsio* (s. str.). In summary, the relationships of the new species seem best expressed by placing it in the new subgenus *Distorsio (Distorsionella)*, differing from *D. (Personella)* in its reticulate protoconch, its widely open aperture and its long, tapering last whorl.

The new species *Distorsio lewisi* superficially resembles *Semitriton*. However, the type species of *Semitriton* Cossmann (Cossmann 1903, p. 102) (*Plesiotriton dennanti* Tate, 1898, Upper Eocene, Australia) has typically cancellariid columellar plaits and a tilted, paucispiral, smooth protoconch with a large inrolled apex and ends in a low varix, and so the genus belongs in the Cancellariidae near *Plesiotriton*. The other Australian Eocene species, *S. varicosus* (Tate, 1888) has a similar protoconch. Species of the New Zealand Eocene to Middle Miocene genus *Tatara* Fleming (Fleming 1950, p. 247; type species *Cymatium pahense* Marshall & Murdoch, 1921, Middle Eocene, New Zealand) are similar to *Distorsio lewisi* also, but have large columellar plaits of cancellariid type situated much higher up the columella than in *Distorsio (Distorsionella)*, and *Tatara* therefore belongs in the Cancellariidae near *Semitriton*. Protoconchs of *Semitriton* species (Figs 1, 3) and *Tatara revoluta* (Finlay) (Fig. 2) and a shell of *Distorsio (Personella) septemdentata* Gabb (Fig. 25) are included for comparison with those of *Distorsio (Distorsionella) lewisi*.

Distorsio (Distorsionella) lewisi n. sp.

Figs 5, 8, 19-24, 30A

Shell small, with spire slightly shorter than height of aperture plus canal. Whorls narrowly shouldered below upper suture, otherwise regularly and lightly convex; last whorl elongate, drawn out into a moderately long, widely open, gradually tapered siphonal canal. Varices well raised but narrow, weakly hollowed abaperturally, situated at each two thirds of a whorl. Sculpture of low, narrow, rounded spiral cords, three on spire whorls and seven on last whorl, the interspaces filled by numerous secondary and tertiary spiral threads; cancelled by low, narrow, rounded collabral costae at the same spacing as the spiral cords, with low, weak, nodules at the sculptural junctions, the whole surface crossed by numerous low, narrow collabral lamellae. Aperture large, long and narrowly triangular-ovate, with deeply excavated columella, and seven low denticles of almost even height (the uppermost smaller than those below it) inside the lightly flared outer lip; inner lip a thin callus spread a third of the way up the previous whorl, with a single large parietal ridge margining the wide posterior sinus, and with a row of four to six denticles on a callus pad at the base of the columella, the denticles decreasing in size down the columella as in other *Distorsioninae*. The upper two to three columellar denticles are continuous up the columella with the upper ones of previous apertures, forming extremely weak, very anteriorly placed columellar plaits. Protoconch (Fig. 5) not complete on any available specimen; broken remnant on larger paratype from stn. 197 turbiniform, with widely spaced, low, narrow spiral cords reticulated by widely spaced, low, narrow, collabral costae, as in *Sassia* (s. str.). Shell white. Periostracum light brown (wet) or pale straw-yellow (dry), a thin coating bearing dense, minute bristles, and sparse larger bristles, 1-2 mm long, at the sculptural junctions. Operculum (Fig. 8) irregularly quadrate-oval, small for aperture size, thin, pale yellow-brown, with curved growth ridges centred on right anterior corner, but lacking a nucleus. Proboscis long and slender, coiled in proboscis sheath (but not as extremely so as in *Distorsio* s. str.; Lewis 1972; fig. 14, 20-22), with extremely minute buccal mass at anterior end of proboscis; radula (Fig. 30A) minute (ca. 0.08 mm wide), with a short, wide, lightly curved

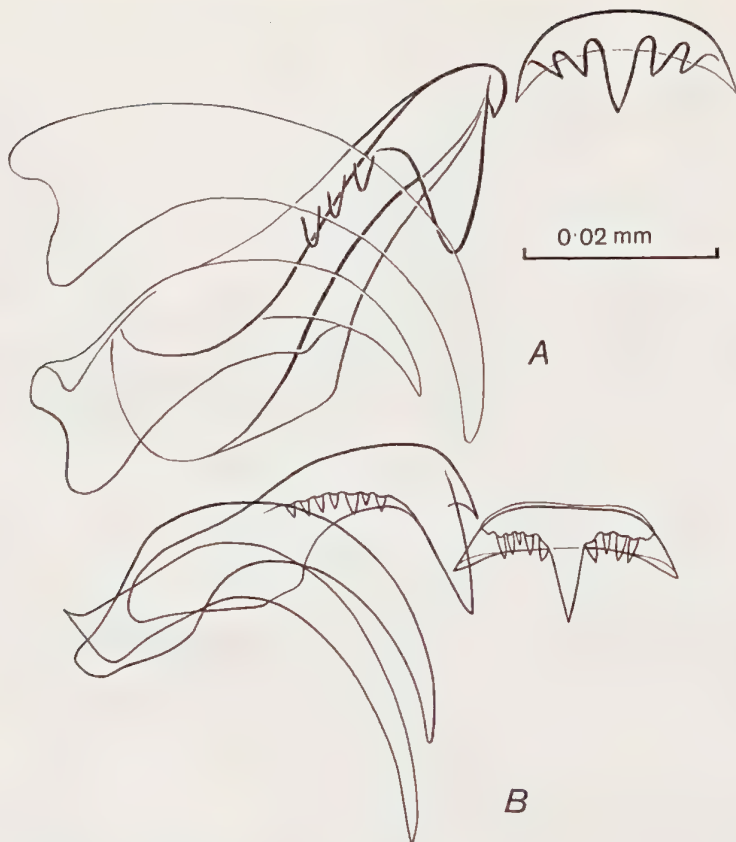


Figure 30. Radulae of *Distorsio*.

A. *Distorsio (Distorsionella) lewisi* n. sp., paratype NZOI P324, N.Z. Oceanographic Inst. stn. 197, Wanganella Bank, Norfolk Ridge, 540-544 m.

B. *Distorsio (Distorsio) anus* (Linnaeus), type species of *Distorsio* Röding; Plantation Reef, Marau Sound, Guadalcanal, Solomon Islands, coll. R.K. Dell; N.Z. National Museum (at markedly smaller scale than A).

central tooth having a large central cusp and two smaller lateral cusps, massive thick lateral teeth having a strongly hooked main cusp and an inner and three to four outer denticles, and two very thin, strongly hooked marginal teeth.

Dimensions: height 37.5 mm, diameter 19.8 mm (holotype); height 35.2 mm, diameter (incomplete) 19.3 mm (paratype, P325); height 26.4 mm, diameter 13.3 mm (smallest paratype, P323).

Holotype (NZOI 230) and three paratypes (NZOI P323-5) in New Zealand Oceanographic Institute, Wellington.

Localities: N.Z. Oceanographic Institute stn. P57, 33° 15.0'S, 169° 59.0'E, central Reinga Ridge (between northern New Zealand and Norfolk Ridge), 563-614 m, 4/2/1977 (holotype); N.Z. Oceanographic Institute stn. K870, 31° 21.2'S, 178° 44.5'W, 510-610 m, off l'Esperance Rock, Kermadec Islands, 2/8/1974 (broken adult paratype, P325); N.Z. Oceanographic Institute stn. 197, 32° 22.9'S, 167° 28.2'E, 540-544 m, Wanganella Bank, southern Norfolk Ridge, 25/7/1975 (two immature paratypes, P323-4, collected alive).

The obvious varices, long narrow aperture and extended last whorl, finely cancellate shell surface, strongly excavated columella, and base of the columella bearing an anteriorly decreasing row of ridges will make this shell readily recognisable.

The extremely minute buccal mass and radula proved difficult to recognise during dissection, and were found in only one of the dissected animals, and then by accident. The radula was examined and sketched (Fig. 30A) at X 625, at which power some details of cusp arrangement, and especially the structure of the base of the lateral teeth, could not be resolved. However, the general shape of the teeth and the position and relative sizes of most cusps were clear. The radula, and especially the central tooth, is similar to the much larger radula of *Distorsio* (*Distorsio*) *anus* (Linnaeus) (Fig. 30B).

The new species is named in honour of Mr Hal Lewis of Philadelphia, who has done so much to clarify the genus *Distorsio* (Lewis 1972) and who continues to be one of the few colleagues to appreciate the nuances of cymatiid taxonomy.

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